

1. A bipolar radio frequency electrosurgical instrument comprising at least first and second electrodes, each of the first and second electrodes having a tissue-treatment region wherein, in use, current flows in a pathway from the tissue-treatment region of one electrode to the tissue-treatment region of the other electrode, and at least one dielectric element made of a dielectric material, the dielectric element having a tissue-contacting portion and being positioned in the current pathway between the tissue-treatment regions of the first and second electrodes, the dielectric element having a reactive impedance of less than 3,000 ohms/sq.mm. at 450kHz.
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2. A bipolar radio frequency electrosurgical instrument according to claim 1, wherein the dielectric element has a reactive impedance of between 700 and 2,500 ohms/sq.mm. at 450kHz.
3. A bipolar radio frequency electrosurgical instrument according to claim 2,
15 wherein the dielectric element has a reactive impedance of between 800 and 2,340 ohms/sq.mm. at 450kHz.
4. A bipolar radio frequency electrosurgical instrument according to claim 1, wherein the dielectric element is made of a ceramic material.
5. A bipolar radio frequency electrosurgical instrument according to claim 4,
20 wherein the ceramic material is a barium titanate material.
6. A bipolar radio frequency electrosurgical instrument according to claim 1, wherein the dielectric element comprises a dielectric coating at least partially covering the tissue-treatment region of one of the electrodes.
7. A bipolar radio frequency electrosurgical instrument according to claim 1,
25 having first and second dielectric elements comprising dielectric coatings at least partially covering the tissue-treatment regions of the first and second elements.
8. A bipolar radio frequency electrosurgical instrument according to claim 1, wherein the tissue-treatment region of at least one of the electrodes is completely covered with the dielectric material.

9. A bipolar radio frequency electrosurgical instrument according to claim 1, wherein the tissue-treatment region of both of the electrodes is completely covered with the dielectric material.

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10. A bipolar radio frequency electrosurgical instrument according to claim 1, wherein the instrument is in the form of pair of forceps.

11. A bipolar radio frequency electrosurgical instrument according to claim 1,
10 wherein the instrument is in the form of a scalpel blade.

12. An electrosurgical instrument comprising a bipolar cutting blade and a handpiece to which the blade is secured, the cutting blade comprising first and second electrodes and an electrical insulator spacing apart the electrodes, each of the first and
15 second electrodes having a tissue-treatment region, wherein, in use, current flows in a pathway from the tissue-treatment region of one electrode to the tissue treatment region of the other electrode, and at least one dielectric element made of a dielectric material, the dielectric element having a tissue-contacting portion and being positioned in the current pathway between the tissue-treatment regions of the first and second electrodes,
20 the dielectric element having a reactive impedance of less than 3,000 ohms/sq. mm. at 450kHz.

13. An electrosurgical instrument according to claim 12, wherein the electrical insulator is at least partially coated with the dielectric material.

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14. An electrosurgical system for treating tissue, the system comprising a bipolar radio frequency instrument comprising at least first and second electrodes, each of the first and second electrodes having a tissue-treatment region, and an electrosurgical generator adapted to supply a radio frequency output to the electrodes of the instrument
30 at a frequency f, such that current flows in a pathway from the tissue-treatment region of one of the electrodes to the other, and a dielectric material, the dielectric material having a tissue-contacting portion and being positioned in the current pathway between

the tissue-treatment regions of the first and second electrodes, the dielectric element having a reactive impedance at the frequency f of less than 3,000 ohms/sq. mm.

15. An electrosurgical system for treating tissue, the system comprising a bipolar
5 radio frequency instrument comprising at least first and second electrodes, each of the
first and second electrodes having a tissue-treatment region, and an electrosurgical
generator adapted to supply a radio frequency output to the electrodes of the instrument
at a frequency of 6.79MHz, such that current flows in a pathway from the tissue-
treatment region of one of the electrodes to the tissue treatment region of the other
10 electrode, and at least one dielectric element made of a dielectric material, the dielectric
element having a tissue-contacting portion and being positioned in the current pathway
between the tissue-treatment regions of the first and second electrodes, the dielectric
element having a reactive impedance at the 6.79MHz of less than 3,000 ohms/sq. mm.

15 16. An electrosurgical system for treating tissue, the system comprising a bipolar
radio frequency instrument comprising at least first and second electrodes, each of the
first and second electrodes having a tissue-treatment region, and an electrosurgical
generator adapted to supply a radio frequency output to the electrodes of the instrument
at a frequency of 13.56MHz, such that current flows in a pathway from the tissue-
treatment region of one of the electrodes to tissue treatment region of the other
20 electrode, and at least one dielectric element made of a dielectric material, the dielectric
element having a tissue-contacting portion and being positioned in the current pathway
between the tissue-treatment regions of the first and second electrodes, the dielectric
element having a reactive impedance at the 13.56MHz frequency of less than 3,000
25 ohms/sq. mm.

17. An electrosurgical system for treating tissue, the system comprising a bipolar
radio frequency instrument comprising at least first and second electrodes, each of the
first and second electrodes having a tissue-treatment region, and an electrosurgical
30 generator adapted to supply a radio frequency output to the electrodes of the instrument
at a frequency of 27.12MHz, such that current flows in a pathway from the tissue-
treatment region of one of the electrodes to the tissue treatment region of the other
electrode, and at least one dielectric element made of a dielectric material, the dielectric

element having a tissue-contacting portion and being positioned in the current pathway between the tissue-treatment regions of the first and second electrodes, the dielectric element having a reactive impedance at the 27.12MHz frequency of less than 3,000 ohms/sq.mm.

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18. An electrosurgical system for treating tissue, the system comprising a bipolar radio frequency instrument comprising at least first and second electrodes, each of the first and second electrodes having a tissue-treatment region, and an electrosurgical generator adapted to supply a radio frequency output to the electrodes of the instrument
10 at a frequency of 40.68MHz, such that the current flows in a pathway from the tissue-treatment region of one of the electrodes to the tissue treatment region of the other electrode, and at least one dielectric element made of a dielectric material, the dielectric element having a tissue-contacting portion and being positioned in the current pathway between the tissue treatment regions of the first and second electrodes, the dielectric
15 element having a reactive impedance at the 40.68MHz frequency of less than 3,000 ohms/sq.mm.

19. An electrosurgical instrument comprising a bipolar tissue cutting blade and a handpiece to which the blade is secured, wherein the blade comprises a laminar
20 combination of first and second electrically conductive electrodes spaced apart by an intermediate insulating layer, the electrodes having neighbouring co-extensive edge portions forming tissue-treatment regions, and wherein the blade further comprises at least one dielectric element formed as a tissue-contacting extension of the edge portion of the second electrode, the dielectric element being made of a dielectric material
25 having a relative dielectric constant which is at least 10 times greater than that of the material of the intermediate layer.

20. An instrument according to claim 19, wherein the dielectric element at least partially covers the edge portion of the second electrode.
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21. An instrument according to claim 19, wherein the dielectric element is a dielectric coating covering the tissue-treatment region of the second electrode.

22. An instrument according to claim 19, wherein the dielectric element is an elongate element extending along the edge portion of the second electrode.

23. An instrument according to claim 19, wherein the insulating layer has an edge portion co-extensive with the electrode edge portions and wherein the dielectric element is an elongate element abutting and extending longitudinally along the edge portion of the second electrode, and at least partially covering the insulating layer edge portion.